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EXAMINER	
PHAM, EMILY P	

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2838	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,383	LINDAHL ET AL.	
	Examiner	Art Unit	
	EMILY PHAM	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/13/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42-93* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/24/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/24/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 3/24/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

2. The abstract of the disclosure is objected to because it does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Claims 44 and 45 are objected because claims 44 and 45 recite the limitation “a control member”, it is unclear “a control member” of claims 44 and 45 is the same with “voltage control member” of claim 1.

4. Claim 74 is objected because claim 74 recites the limitations “Z” and “Zv is the real part of the surge impedance”, it is unclear Z and Zv are the same.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 42-46, 48, 50, 58, 66-74, 77-80, 83-87, 90-93 are rejected under 35 U.S.C. 102(b) as being anticipated by Schauder et al. (USP 5,734,257).

Regarding independent claim 42: Schauder et al. **(Abstract, FIG 2)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks, comprising: at least one AC transmission cable **(34)**; at least one transformer **(36, 38)** arranged at each end of the at least one AC transmission cable **(34)**; a voltage control member **(22, 24, 54, 56)** operatively connected to the at least one said transformer **(36, 38)** and operative to operate the transformer at a voltage whereby losses due to reactive power transport are minimized **(col. 4, line 9 - col. 5, line 17)**.

Regarding dependent claim 43: Schauder et al. disclose the system further comprising: a control member to operate said system at an optimal voltage dependent on a surge impedance of the cable and an instantaneous power level **(col. 2, lines 6-19)**.

Regarding dependent claim 44: Schauder et al. disclose the system further comprising: a control member **(22, 24, 54, and 56)** operative to operate

said system at an optimal voltage dependent on an instantaneous power level equal to a Natural Load of the cable **(col. 2, lines 6-19)**.

Regarding dependent claim 45: Schauder et al. disclose the system further comprising: a control member **(22, 24, 54, and 56)** operative to operate said system at a voltage whereby a sum of resistive losses, dielectric losses and charging losses are minimized **(Detailed Description of the Invention)**.

Regarding dependent claim 46: Schauder et al. disclose the system, wherein the control member is arranged for communication with control equipment at both ends of said AC transmission cable **(FIG 2)**.

Regarding dependent claim 48: Schauder et al. disclose the system, wherein the at least one transformer **(36, 38)** is arranged to operate with a wide ratio of input voltage to output voltage of between 1:1 to 1:2, or greater **(ratio of transformer)**.

Regarding dependent claim 50: Schauder et al. disclose the system, wherein the voltage control member comprises a power electronic device which may be any of the list of: IGBT, IGCT, GTO, Thyristor, Diode **(FIG 1, 28)**.

Regarding dependent claim 58: Schauder et al. disclose the system, further comprising: one or more parallel cables for each phase **(FIG 3, Va, Vb, Vc)**, wherein each cable is arranged for rapid disconnect and reconnect.

Regarding dependent claim 66: Schauder et al. disclose the system, wherein one end of the transmission cable may be connected to one or more electrical machines isolated from the rest of the system **(Abstract, Detailed Description of the Invention)**.

Regarding dependent claim 67: Schauder et al. disclose the system, wherein one of the at least one transformer arranged nearest the one or more electrical machines has a fixed transformation ratio or is equipped with off-load tap-changers only **(Detailed Description of the Invention)**.

Regarding dependent claim 68: Schauder et al. disclose the system, wherein voltage regulation of the one or more electrical machines is controlled according to natural load and minimize losses principle applied to a tap changer **(Detailed Description of the Invention)**.

Regarding independent claim 69: Schauder et al. **(Abstract, FIG 2)** disclose an apparatus to perform method to control a high voltage AC transmission cable system for transmitting power between two points connected to one or more power networks, the method comprising: arranging at least one transformer **(36, 38)** arranged at each end of an AC transmission cable **(34)**; and operating the cable with a variable voltage that may differ from a voltage of said one or more power networks **(Detailed Description of the Invention)**.

Regarding dependent claim 70: Schauder et al. disclose the system, further comprising: regulating the voltage dependant on a function of a natural load of said AC transmission cable, and thereby controlling a level of reactive power transported into any of said one or more power networks **(Abstract, Detailed Description of the Invention)**.

Regarding dependent claim 71: Schauder et al. disclose the system, wherein the voltage is regulated dependent on the natural load, whereby losses

at due to resistive, dielectric effects are minimized **(Abstract, Detailed Description of the Invention)**.

Regarding dependent claim 72: Schauder et al. disclose the apparatus to perform method, wherein the voltage is regulated under no-load conditions such that losses are reduced while maintaining voltage above a lower, minimum voltage level depending on system conditions **(Abstract, Detailed Description of the Invention)**.

Regarding dependent claim 73: Schauder et al. disclose the apparatus to perform method, wherein the voltage is regulated under low load conditions such that losses are reduced while maintaining voltage above a lower, minimum voltage level depending on system conditions **(Abstract, Detailed Description of the Invention)**.

Regarding dependent claim 74: Schauder et al. disclose the apparatus to perform method, further comprising: regulating the voltage dependent in part on an equation of the form: v= {square root over (Z.Pactual)} where V is voltage, Zv is the real part of the surge impedance and Pactual is the present active power flow **(Detailed Description of the Invention; col. 6, equation 3)**.

Regarding dependent claim 77: Schauder et al. disclose the apparatus to perform the method, further comprising: regulating the voltage with more than one transformer that are operated synchronously with each other **(Detailed Description of the Invention)**.

Regarding dependent claim 78: Schauder et al. disclose use of a high voltage AC transmission cable system for transmitting power between two points

as a power feeder for large, densely populated urban or suburban areas **(Detailed Description of the Invention)**.

Regarding dependent claim 79: Schauder et al. disclose use of a high voltage AC transmission cable system for transmitting power over a distance between two points in which a part of the distance is across water **(Detailed Description of the Invention)**.

Regarding dependent claim 80: Schauder et al. disclose use of a high voltage AC transmission cable system for transmitting power between two points wherein one point comprises one or more electrical machines isolated from an electrical power network **(Detailed Description of the Invention)**.

Regarding independent claim 83: Schauder et al. **(Abstract, FIG 2)** disclose a high voltage AC transmission cable system for transmitting power between two points each connected to one or more power networks wherein at least one transformer **(36, 38)** is arranged at each end of an AC transmission cable **(34)**, the system comprising: at least one said transformer **(36, 38)**; and a voltage control member **(22, 24, 54, 56)** operative to operate the at least one transformer **(36, 38)** at a voltage dependent on the surge impedance of the cable whereby losses due to reactive power transport are minimized **(Detailed Description of the Invention)**.

Regarding dependent claim 84: Schauder et al. disclose the system, further comprising: a control member operative to operate said system at an optimal voltage dependent on the surge impedance of the cable and the instantaneous power level **(Detailed Description of the Invention)**.

Regarding dependent claim 85: Schauder et al. disclose the system, further comprising: a control member operative to operate said system, at an optimal voltage dependent on an instantaneous power level equal to the Natural Load of the cable **(Detailed Description of the Invention)**.

Regarding dependent claim 86: Schauder et al. disclose the system, further comprising: a control member operative to operate said system at a voltage whereby the sum of the resistive losses, dielectric losses and charging losses are minimized **(Detailed Description of the Invention)**.

Regarding dependent claim 87: Schauder et al. disclose the system, wherein the control member is arranged for communication with control equipment at both ends of said AC transmission cable . **(Detailed Description of the Invention)**.

Regarding dependent claim 90: Schauder et al. disclose the system, wherein one end of the transmission cable may be connected to one or more electrical machines isolated from the rest of the system **(Detailed Description of the Invention)**..

Regarding dependent claim 91: Schauder et al. disclose the system, wherein one of the at least one transformer arranged nearest the one or more electrical machines has a fixed transformation ratio or is equipped with off-load tap-changers only **(Detailed Description of the Invention)**.

Regarding independent claim 92: Schauder et al. **(Abstract, FIG 2)** disclose an apparatus to perform method to control a high voltage AC transmission cable system for transmitting power between two points connected

to one or more power networks, the method comprising: arranging at least one transformer **(36, 38)** arranged at each end of an AC transmission cable **(34)**; and operating the cable **(34)** with a variable voltage dependent on a surge of impedance of the transmission cable, which may differ from a voltage of said one or more power networks **(Detailed Description of the Invention)**.

Regarding dependent claim 93: Schauder et al. disclose system, further comprising: regulating the voltage dependant on a function of a natural load of said AC transmission cable, and thereby controlling a level of reactive power transported into any of said one or more power networks **(Detailed Description of the Invention)**.

7. Claim 81 is rejected under 35 U.S.C. 103(a) as being anticipated by Flint et al. (USP 6,141,634). Flint et al. **(Abstract, Detailed Description of the Invention)** disclose a system for communication and control for a high voltage AC transmission cable system for transmitting power between two points connected to one or more power networks wherein high speed data communication members **(col. 4, lines16-27)** are arranged for communication with control equipment for at least one transformer arranged at at least one end of an AC transmission cable.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Independent claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Ghosh et al. (USP 6,925,385). Schauder et al. disclose a high voltage AC transmission cable system for transmitting power between two points connected to one or more power networks **(Abstract)**, wherein at least one transformer **(36, 38)** is arranged at each end of an AC transmission cable **(34)**. However Schauder et al. do not disclose a graphical user interface for controlling the AC transmission, the interface comprising: at least one object oriented application for presenting data, parameter values and control actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer. Ghosh et al. teach a graphical user interface for controlling the AC transmission (**GUI to control and manage the wind power system)** the interface comprising: at least one object oriented application for presenting data, parameter values and control actions for operating parameters of the AC transmission cable system and/or a control system for at least one transformer **(FIG 2 – FIG 10; col. 11, lines 20-30)**. Schauder et al. and Ghosh et al. disclose power management system. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Schauder et al. with the GUI system taught by Ghosh

et al. for the purpose of control and manage the AC power transmission system through data and parameters communication.

10. Dependent claims 47, 75, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Hubert et al. (USP 6,577,108). Schauder et al. disclose claimed invention except for the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time. Hubert et al. teach the control member is arranged with control instructions for operation of said AC transmission cable under thermal overload conditions during limited periods of time **(FIG 4, FIG 5; col. 5, lines 29-45)**. Schauder et al. and Hubert et al. disclose utility power network. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the controller of the AC power transmission disclosed by Schauder et al. with the voltage regulation circuit taught by Hubert et al. to monitor the temperature of the AC transmission cable.

11. Dependent claims 49 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Palmer (USP 4,081,741). Schauder et al. disclose claimed invention except for a tap-changer /one or more tap changer by-pass connectors. Palmer (USP 4,081,741) teaches a tap-changer /one or more tap changer by-pass connectors **(FIG 4, col. 3, lines 10-31)**. Schauder et al. and Palmer disclose transformer. It would have been

obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Schauder et al. with the tap changer by-pass connectors taught by Palmer to increase the effectiveness in controlling the reactance of the AC transmission line.

12. Dependent claims 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Larsen et al. (USP 5,166,579). Schauder et al. disclose claimed invention except for mechanical tap-changer/phase-shifting tap changer. Larsen et al. teach mechanical tap-changer/phase-shifting tap changer **(Abstract)**. Schauder et al. and Larsen et al. disclose the usage of transformer. Schauder et al. and Larsen et al. disclose transformer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Schauder et al. with the mechanical tap-changer/phase-shifting tap changer taught by Larsen et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

13. Dependent claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Andrei (USP 6,011,389). Schauder et al. disclose claimed invention except for an autotransformer. Andrei teaches an autotransformer **(Abstract; col. 2, line 50 – col. 3, line 13)**. Schauder et al. and Andrei disclose transformer. It would have

been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Schauder et al. with the autotransformer taught by Andrei to increase the effectiveness in controlling the reactance of the AC transmission line.

14. Dependent claims 55 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Sasse et al. (US Pub 2004/0012472). Schauder et al. disclose claimed invention except that transformer is arranged to limit short-circuit currents. Sasse et al. teaches transformer is arranged to limit short-circuit currents **(par [0033])**. Schauder et al. and Sasse et al. disclose transformer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Schauder et al. with the arrangement taught by Sasse et al. to limit short-circuit currents of the AC transmission line.

15. Dependent claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Retotar (USP 4,591,963). Schauder et al. disclose claimed invention except for a high frequency filter. Retotar teaches a high frequency filter **(FIG 1, 102; col. 2, lines 20-25)**. Schauder et al. and Retotar disclose AC power system. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed

by Schauder et al. with the a high frequency filter taught by Retotar to eliminate the harmonic currents of AC transmission line.

16. Dependent claims 59 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Buckett et al. (USP 4,075,679). Schauder et al. disclose claimed invention except for one or more breakers arranged for rapid disconnect and reconnect. Buckett et al. teach breakers arranged for rapid disconnect and reconnect **(FIG 4, 17)**. Schauder et al. and Buckett et al. disclose AC power transmission system. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the transformers of the AC power transmission system disclosed by Schauder et al. with the breakers taught by Buckett et al. to increase the effectiveness in controlling the reactance of the AC transmission line.

17. Dependent claims 64, 65, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257) in view of Watson et al. ("Surge Potentials on Underground Cable Sheath and Joint Insulation"; IEEE Transactions on Power Apparatus and Systems; June 1963; Volume 82; Issue 66; pages 239-249). Schauder et al. disclose claimed invention except for a cable system shield comprising transposings and sheath sectionalizing insulators reducing shield induced currents. Watson et al. teach a cable system shield comprising transposings and sheath sectionalizing insulators **(col. 1, page 239)**. Schauder et al. and Watson et al. disclose AC transmission line cable. It would

have been obvious to one having ordinary skill in the art at the time the invention was made to modify the cable of the AC power transmission system disclosed by Schauder et al. with the transposings and sheath sectionalizing insulators taught by Watson et al. to protect the line from overvoltage and reduce shield induced currents.

18. Dependent claims 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schauder et al. (USP 5,734,257).

Regarding dependent claims 61-63: Schauder et al. disclose the claimed invention except that one AC transmission cable comprise an oil and paper insulated cable/XLPE insulated cable/ voltage protection devices. However oil and paper insulated cable/XLPE insulated cable/ voltage protection devices are well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use oil and paper insulated cable because it is secured from moisture and dielectric loss; XLPE insulated cable because this cable with a temperature sensing optic fiber placed longitudinally along the cable could be placed in the critical circuit such as duct or overhead transmission line having unknown thermal conditions; voltage protection devices because they protect the AC transmission system from over voltage condition.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Rogers et al. (USP 4,713,720) disclose fast acting solid

state AC circuit breaker, Gyugyi (USP 5,698,969) disclose apparatus and method for interline power flow control, Glinkowski et al. (USP 6,545,453) disclose systems and methods for providing voltage regulation externally to a power transformer, Nandi et al. (US Pub 2004/0105635) disclose fiber optic transmission conductor and distributed temperature sensing of fiber optic transmission conductor, Sen et al. (USP 6,841,976) disclose Multi-line power flow transformer for compensating power flow among transmission lines, Mollenkopf (USP 6,965,303) disclose power line communication system and method, and Couture (USP 7,235,900) disclose switching apparatus and method for varying a phase line impedance of an electric power transport line section.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EMILY PHAM whose telephone number is (571)270-3046. The examiner can normally be reached on Mon-Thu (7:00AM - 6:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272 - 2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 2008

/Jessica Han/
Primary Examiner, Art Unit 2838

/E. P./
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